National Aeronautics and Space Administration

Improving Information Technology Management at NASA

Office of the Chief Information Officer

Project Manage Challenge 2008

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NASA's IT Environment

Users
- 18,000 Employees
- 44,000 Contractors

Spending
- $2 B annually

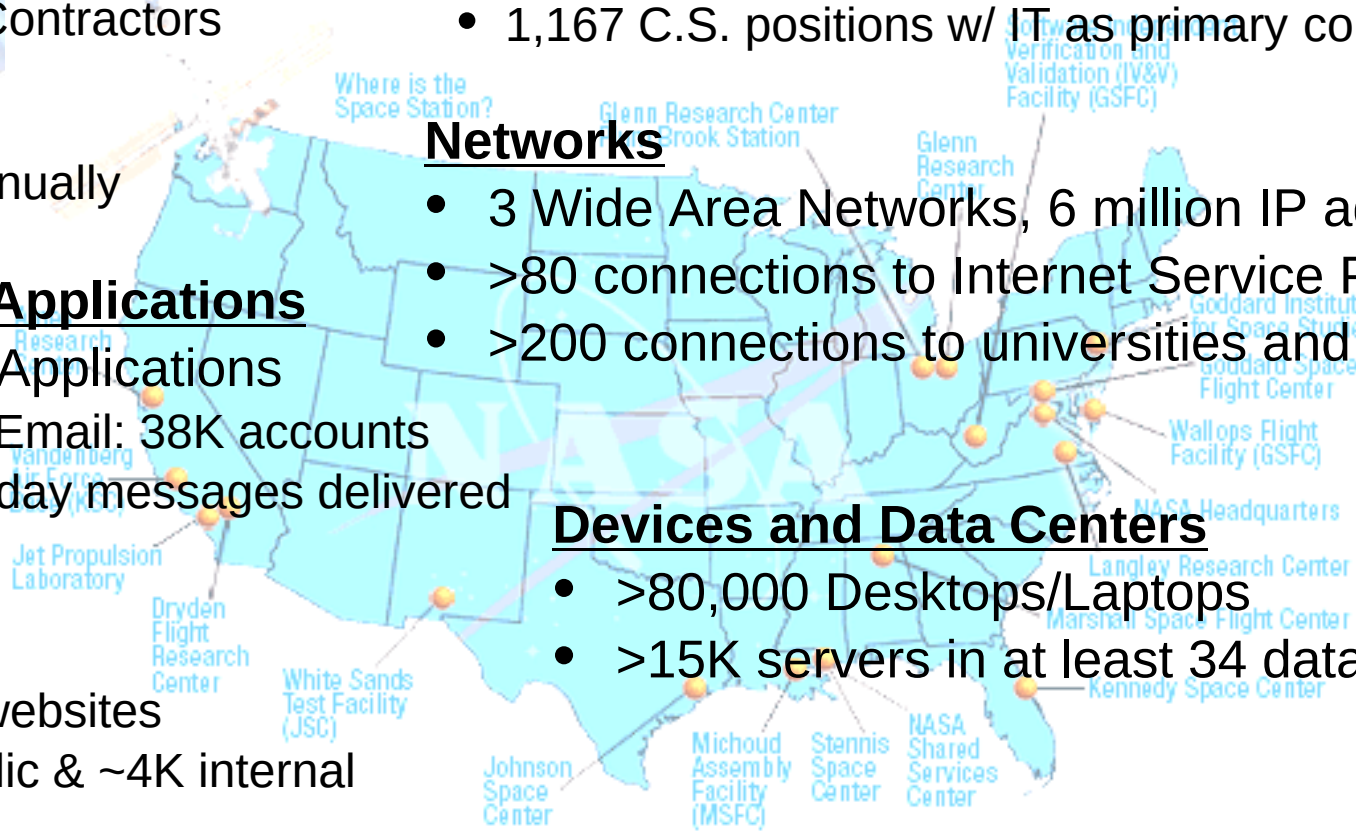
Systems/Applications
- > 2,500 Applications
- NOMAD Email: 38K accounts
  - 530K/day messages delivered

Websites
- >8,000 websites
- ~4K public & ~4K internal

NASA IT Workforce
- 667 FTE, 2,386 WYE managed by CIOs
- 1,167 C.S. positions w/ IT as primary competency

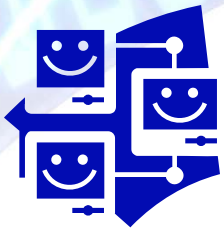
Networks
- 3 Wide Area Networks, 6 million IP addresses
- >80 connections to Internet Service Providers
- >200 connections to universities and partners

Devices and Data Centers
- >80,000 Desktops/Laptops
- >15K servers in at least 34 data centers



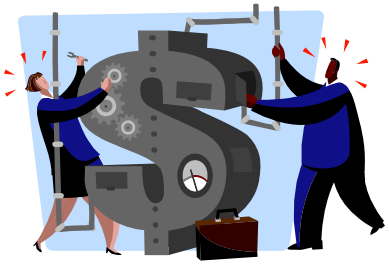
Issues / Challenges

- NASA's current IT infrastructure allows for significant security vulnerabilities



- This infrastructure inhibits cross-center collaboration

- There is significant proliferation of tools and a lack of standards to enable integration



- There is a lack visibility into NASA's IT investments, and there are inadequate controls on IT spending

- There is inconsistent understanding of how IT is managed at NASA

Four Key Principles for IT at NASA

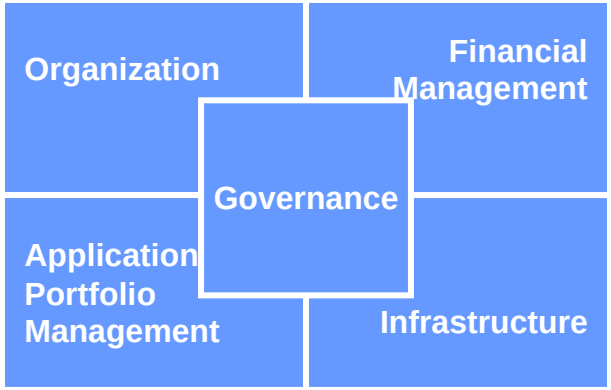
- **IT at NASA serves to enable NASA's mission**
  - IT must understand what is needed to enable the mission
  - We buy before we build whenever possible
- **We will implement information technology that enables the integration of business (mission) processes and information across organizational boundaries**
  - IT serves to bind Centers together not keep them apart
  - NASA trusts NASA
- **We will implement information technology to achieve efficiencies and insure that our IT is efficiently implemented**
  - IT investments are business case driven
  - All IT decisions are not made at the most granular level
- **We will implement secure IT solutions**
  - Security is designed into our IT solutions
  - We will understand the risks we are buying down through IT security

Key Change Initiatives

Overall – Reaffirm and clarify the role of the CIO as stated in NPD 1000.3 and define core IT services that shall be delivered by the CIO

Organization - Realign NASA IT organization to reflect the role of the CIO and better connect the CIO with customers

Application & Tools Assign ownership of application portfolios and create a CIO-facilitated process to drive application standardization and efficiencies



Governance – Create governance structure and processes to engage key stakeholders, inform IT investment decisions, and apply project management discipline to IT projects

Finance – Increase visibility into IT budgeting and spending through management controls and fund base IT services through a combination of Corporate and CM&O

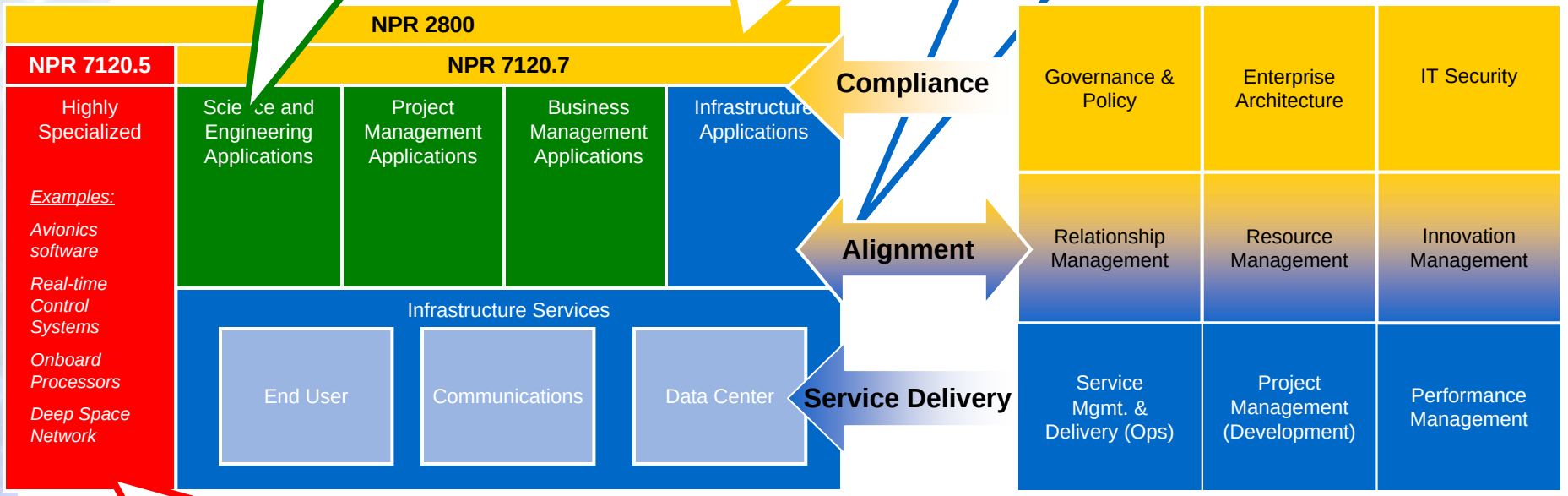
Infrastructure – Improve integration, security, and efficiency by consolidating infrastructure and management control

Role of the CIO in Managing IT

The Centers, Mission Directorates, and Mission Support Offices have responsibility for the applications.

The CIO has overarching responsibility for ensuring alignment of those applications with NASA Enterprise Architecture and standards.

The CIO is responsible for all aspects of the IT infrastructure in which those applications reside.



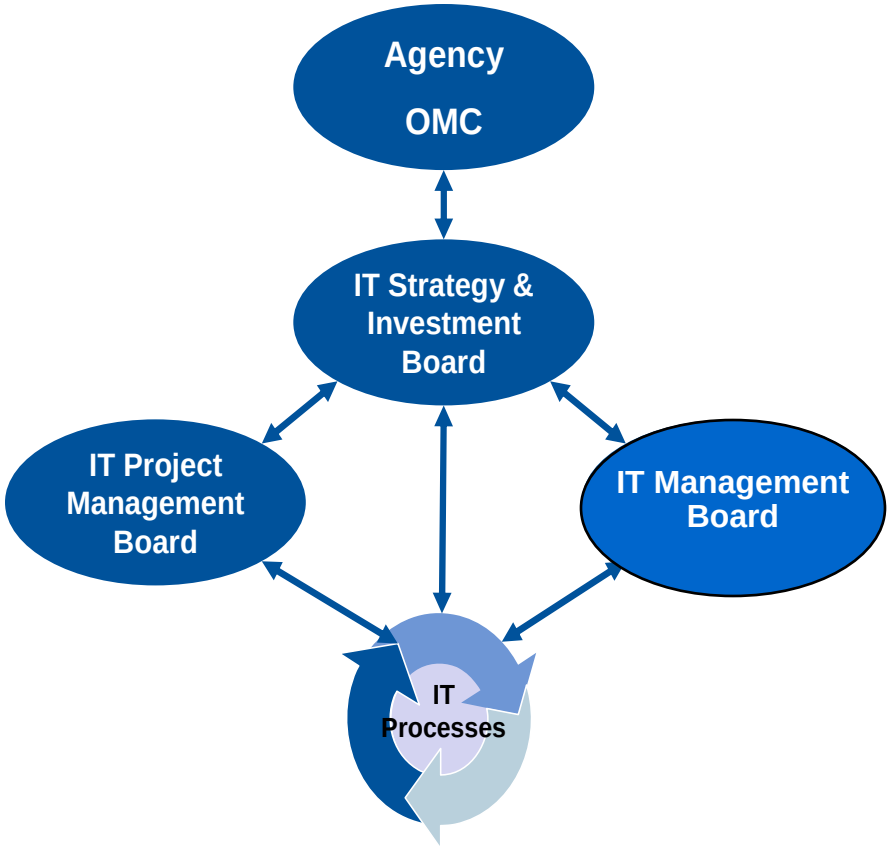
IT Portfolios

CIO Core Functions

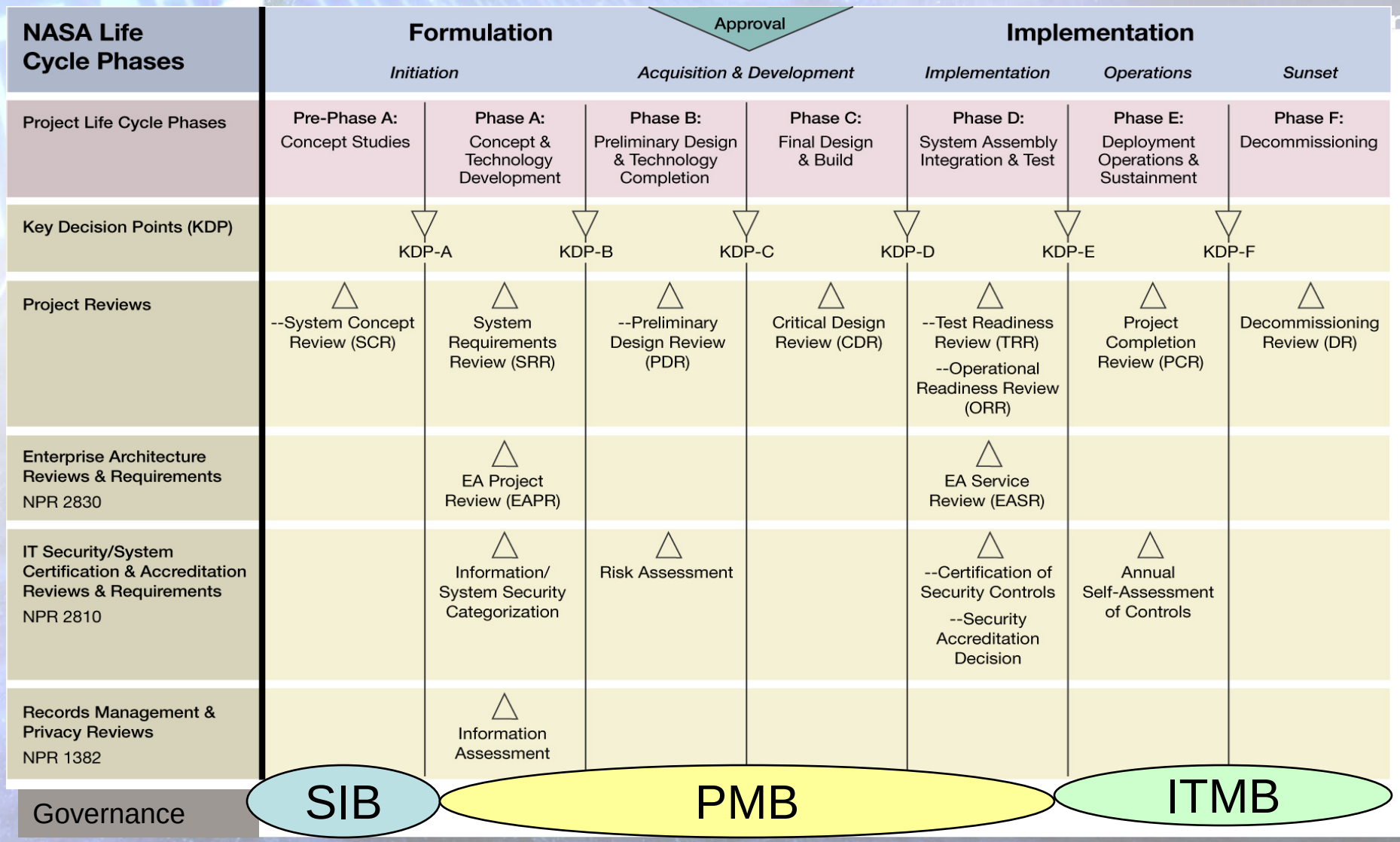
IT that is an embedded component of a flight system, experiment, simulator, ground support environment, or mission control center. Does not necessarily include the IT infrastructure that supports those embedded components.

NASA IT Governance Structure

- **IT Strategy and Investment Board (SIB)**
  - Senior level stakeholders from Mission Directorates, Mission Support, and Centers
  - Decisions regarding IT Investments (prioritization and selection), Enterprise Architecture, and NASA-wide IT policies/processes.
- **IT Program Management Board (PMB)**
  - Decisions regarding application and infrastructure projects to ensure that investments approved by the IT strategy and Investment board stay on track during design and implementation.
- **IT Management Board (ITMB)**
  - Decisions regarding operational performance and issues



7120.7 Project Lifecycle



Infrastructure Management

Consolidate, integrate and secure the NASA infrastructure

- Consolidate management of NASA's networks and security infrastructure (WAN, Center LANs, firewalls) and provide as an integrated, end-to-end service
  - Create a common log in and user authentication experience for users across the NASA enterprise. (HSPD-12)
- Consolidate Data Centers
- Standardize desktop, laptops, and other user devices
- Consolidate Infrastructure applications such as:
  - Email (already in work)
  - Portal Applications and web sites
  - Collaboration software

Information Technology (IT) Priorities

Priorities		Security	Efficiency	Integration
Integrate & Secure Networks	Define network perimeter and consolidate network management	H	M	M
Standardize & Secure End-User Devices	Standardize and secure end-user devices through consolidated management	H	M	M
Consolidate Security Ops and Incident Response	Establish Agency network visibility of IT assets and consolidate Agency security monitoring and mgmt	H	M	L
Consolidation of Applications	Utilize a portfolio management approach to gather the applications baseline and identify opportunities for consolidation	L	H	M
Consolidation of Data Centers	Migrate systems to appropriately managed and secure data centers	H	M	M
Strong Authentication for NASA systems	Enable cross-Center collaboration and strengthen user authorization	H	L	H

Communications Consolidation

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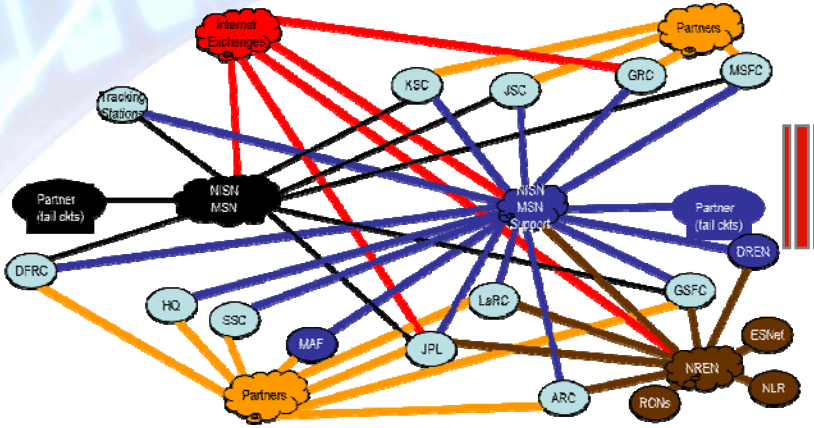
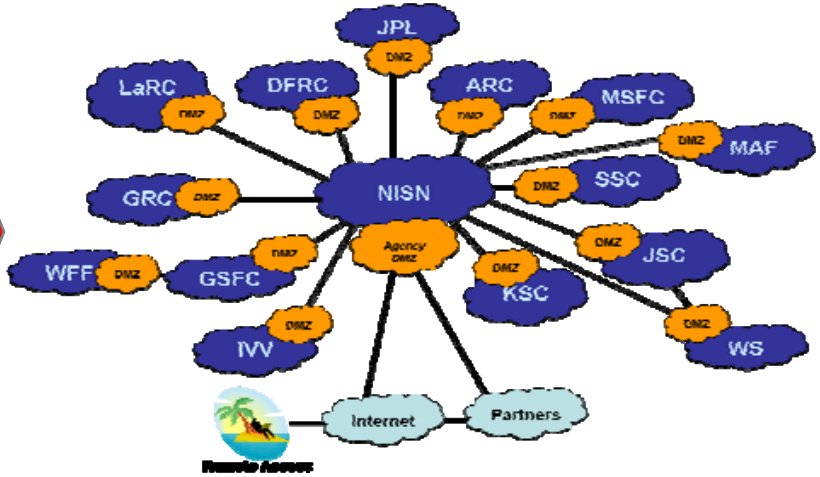




Current State

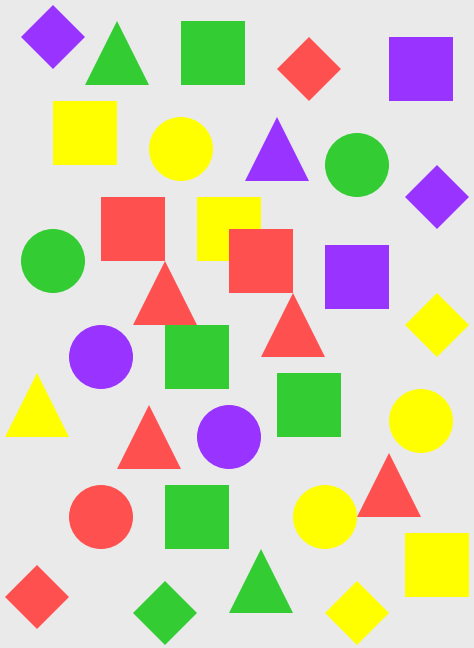
Networks managed as independent services

Planned Future State

Network managed as single enterprise service

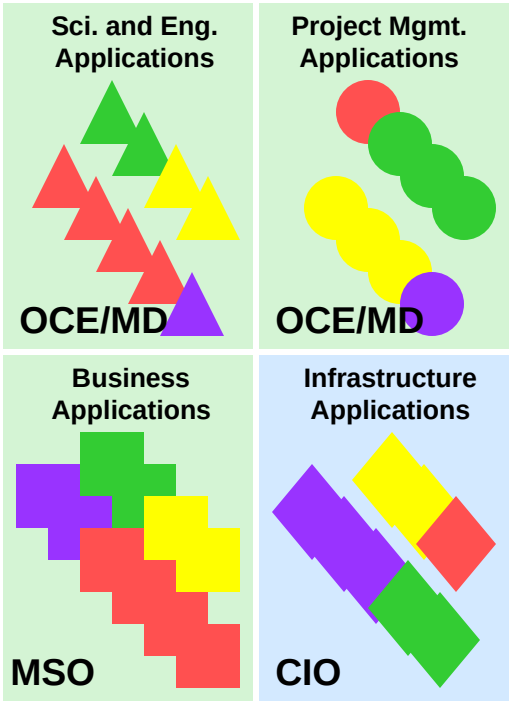
Portfolio Management Strategy

Current State



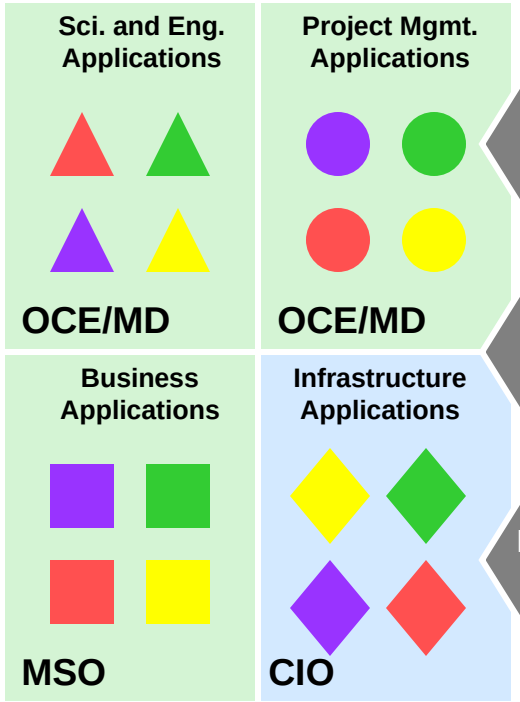
- Over 2500 applications listed in HSPD-12 repository.
- High-level analysis indicates substantial redundancy.
- Application integration not architected at the enterprise level and primarily point to point.

Near Term



- Establish robust governance, portfolio process and stewardship of portfolios.
- Create complete Agency-wide inventory of all application assets.
- Develop architectural strategy for applications integration.

Steady State



- Recurring, lifecycle approach.
- All application demand captured, and managed throughout the "Execution Year".
- CIO responsible for performance goals and EA compliance. Portfolio owners set business standards.

Business Standards

Architecture

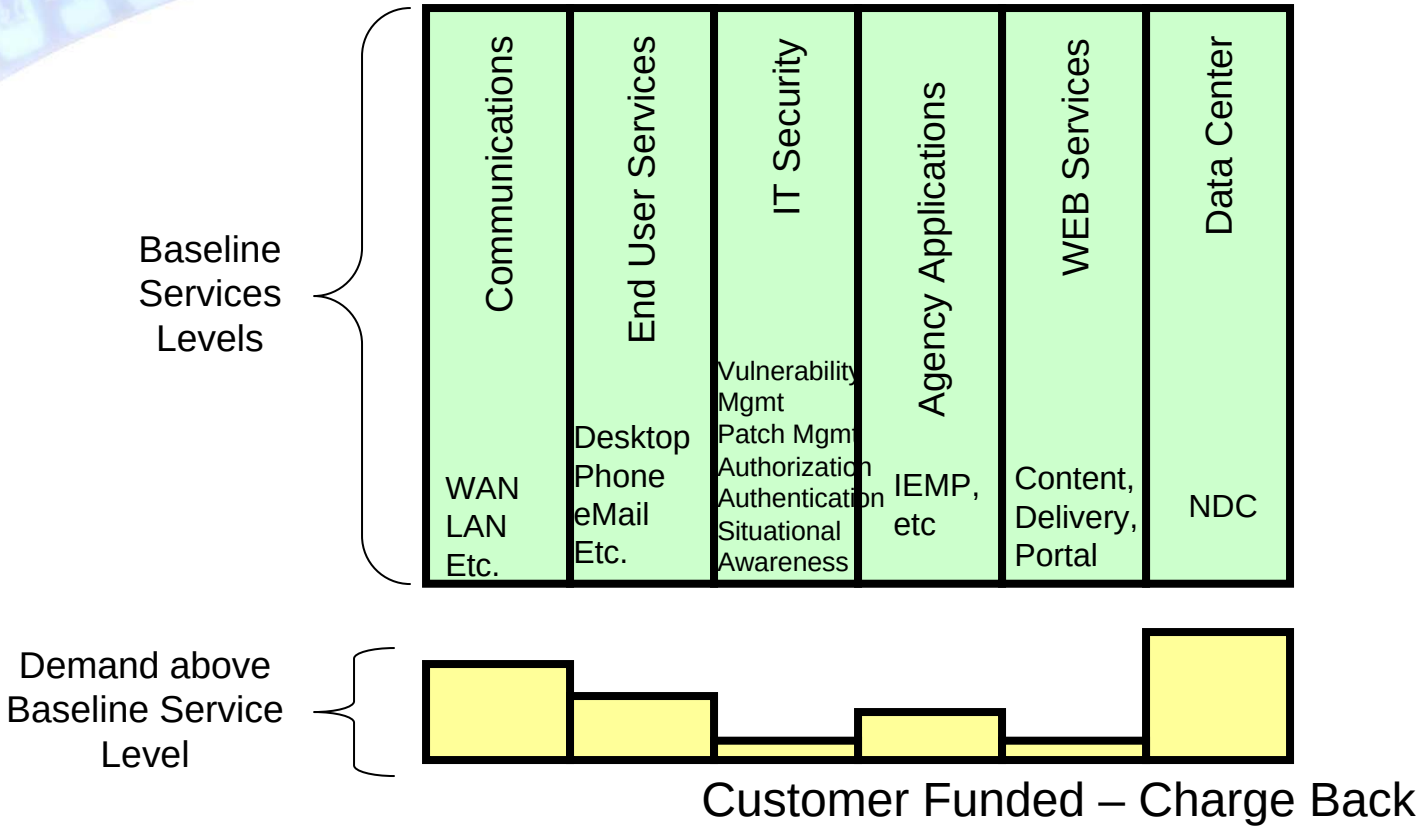
Performance Goals

Investment Planning

Financial Strategy

Funding Source	IT Portfolio	Visibility
MD Apps: Program Direct MSO Apps: Corporate or CMO	Applications	Relationship Management Insight CIO Acquisition Oversight Implement Contract Cost Reporting
Base: Corporate or CMO Over Base: Program Direct	Infrastructure Applications Infrastructure Services End User Communications Data Center	CIO Managed Contracts Implement Contract Cost Reporting
Status Quo	Highly Specialized	Status Quo

Funding Agencywide Infrastructure Services



Summary

- **A significant transformation of NASA's IT management and infrastructure is required in order to better enable NASA's mission by integrating people, processes, and information**
  - **The "10 healthy Centers" model requires maximum collaboration across organizations to achieve the mission**
- **These changes are also required to improve security and can achieve significant efficiencies**
- **NASA must recognize the fundamental relationship that exists between IT and mission success and therefore manage IT strategically**
- **This type of transformation will be difficult and require time but must begin now**
- **Continued strong executive buy-in and sponsorship are critical to success**